

Citation:

Stenberg A, Macdonald C, Hunter PR. How effective is good domestic kitchen hygiene at reducing diarrhoeal disease in developed countries? A systematic review and re-analysis of the UK IID study. *BMC Public Health*. 2008 Feb 22; 8: 71.

PubMed ID: [18294383](#)

Study Design:

Systematic review

Class:

M - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine if household hygiene in relation to food preparation, food handling and food storage practices are important contributors to the development of diarrhea in developed countries.

Inclusion Criteria:

- All publications, irrespective of study design, assessing food hygiene practices with an outcome measure of diarrhea
- Types of exposure identified were around household, especially kitchen, hygiene and cleanliness or concerned food preparation and storage practices at home
- Outcomes included were either self-reported diarrhea with no associated pathogen identified or cases of diarrhea with a known enteric pathogen identified
- Studies whose participants were households, children or adults from developed countries.

Exclusion Criteria:

- Studies that only looked at hand washing or drinking water as factors
- Studies conducted during outbreak investigations.

Description of Study Protocol:**Recruitment**

- Electronic searches were carried out in October 2006 in EMBASE (1980 to date), MEDLINE (1966 to date), Web of Knowledge (to date), Cochrane central register of clinical trials and CINAHL (1982 to date)
- Both standardized and subject-specific search strategies were used and search terms described

- In addition to published studies, the primary data from the UK Intestinal Infectious Disease study was obtained from the UK Data Archive.

Design

Systematic review.

Intervention

- Studies assessing food hygiene practices with an outcome measure of diarrhea
- All included studies underwent data extraction and the data was subsequently analyzed.

Statistical Analysis

- The analysis was conducted by qualitative synthesis of the results
- Methodological quality assessment was based largely on whether or not the results were controlled for possible confounding variables
- Low-quality studies did not control for any confounding, medium-quality studies controlled for age and gender, high-quality studies controlled for multiple confounding variables
- Given the substantial heterogeneity in study design and outcome measures, meta-analysis was not done
- The existing dataset of the UK IID study was re-analyzed to investigate possible associations between self-reported diarrhea and variables indicative of poor domestic kitchen hygiene, using conditional logistic regression.

Data Collection Summary:

Dependent Variables

Outcomes included were either self-reported diarrhea with no associated pathogen identified or cases of diarrhea with a known enteric pathogen identified.

Independent Variables

Food hygiene practices: Types of exposure identified were around household, especially kitchen, hygiene and cleanliness or concerned food preparation and storage practices at home.

Control Variables

- Age
- Gender
- Other confounding variables.

Description of Actual Data Sample:

- *Initial N*: Initial search yielded 1,378 studies. 378 studies were identified, which were further narrowed to 48 studies following review of abstracts and hard copies
- *Attrition (final N)*: 14 studies included in subsequent analyses (11 case-control studies, two cross-sectional surveys and one randomized control trial)
- *Location*: International studies.

Summary of Results:

Key Findings

- Very few studies identified any significant association with good environmental kitchen hygiene and the disease outcomes
- Although some of the variables in the re-analysis of the UK IID study were statistically significant, no obvious trend was seen
- Factors associated with a lower risk of self-reported diarrhea were not using separate chopping boards for raw and cooked meats (odds ratio = 0.803; 95% CI: 0.648 to 0.994) or for other raw and cooked foods (odds ratio = 0.741; 95% CI: 0.599 to 0.919)
- The factor associated with a higher risk was storing food anywhere in the fridge other than on the bottom shelf (odds ratio = 1.419; 95% CI: 1.155 to 1.742)
- Normally cooling food on the work surface rather than a refrigerator was associated with a reduced risk (odds ratio = 0.704; 95% CI: 0.552 to 0.897).

Other Findings

- There were only one high-quality study, nine medium-quality and three low-quality studies
- Variables likely to be associated with bacterial regrowth in foods were also not associated with self-reported diarrhea (owning a fridge or freezer, not storing foods for later in a fridge, packing frozen foods together for transport home) or were associated with a reduced risk of illness.

Author Conclusion:

- This review does not support the hypothesis that poor general environmental hygiene in the domestic kitchen is a risk factor for *Salmonella*, *Campylobacter* or self-reported diarrhea. There is evidence that poor kitchen hygiene may be a risk factor for Enterohemorrhagic *E. coli*, but this was a single low quality study with few cases and no adequate control for possible confounding. However, all the data with one exception were based on observational studies and consequently no unequivocal conclusions can be drawn at this stage
- It is doubtful that the impact of domestic kitchen hygiene will be firmly resolved, based on case-control studies. We would argue that there is a need for properly conducted prospective cohort or randomized intervention studies to really investigate the contribution of particular domestic kitchen hygiene practices may or may not have on the risk of diarrheal disease.

Reviewer Comments:

- *Authors note that one of the problems with this systematic review was that observational studies included used several different risk factors and used different end points*
- *In addition, one other problem when trying to identify risk factors from observational studies is that authors often do not list all potential risk factors included in the questionnaire if they are not statistically significant.*

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

1. Will the answer if true, have a direct bearing on the health of patients?

Yes

2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes
4.	Will the information, if true, require a change in practice?	Yes

Validity Questions

1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search terms used described?	Yes
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	Yes
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	???
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issues considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	Yes

Copyright American Dietetic Association (ADA).